Building Resilient Avian Influenza Control through Integrated Surveillance

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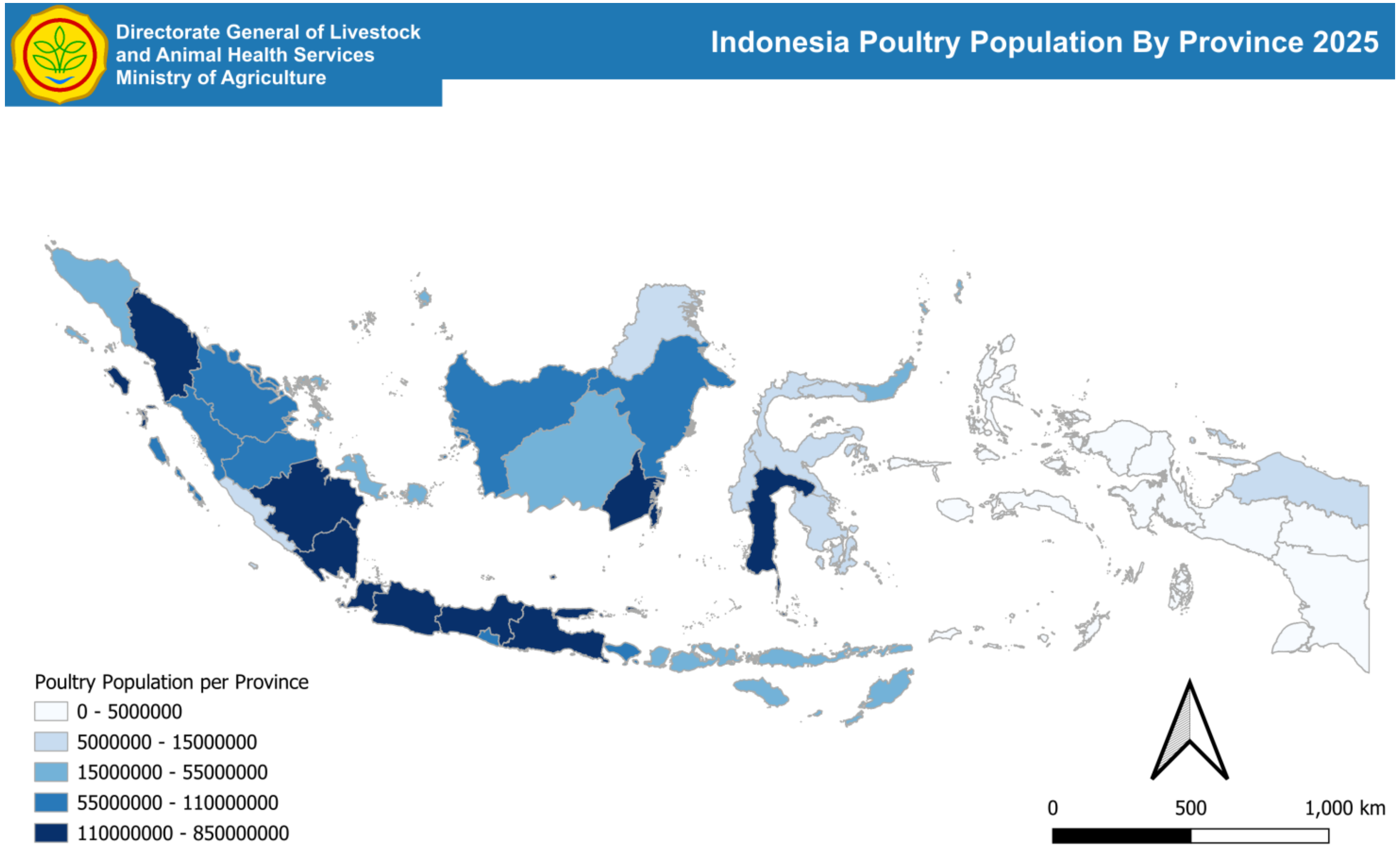
Indonesian Poultry Sector

- One of key sectors for the national economy, supplying 65% of all animal protein and employing 10% of the national labour force.
- Local production successfully copes with domestic demand and market access.
- Export live birds, hatching eggs and poultry products to other countries from HPAI free compartments



Poultry Production and Consumption 2024

Chicken Meat

Domestic demand: 3.72 million tons

Production : 4.03 million tons

Surplus : 0.31 million tons

Chicken Eggs

Domestic demand: 6.03 million tons

Production : 6.20 million tons

Surplus : 0.17 million tons

- Integrated poultry industry
- Public private partnership
- Good Breeding Practices & Good Farming Practices Certification
- Good Hygiene Practice (NKV) Certification
- HPAI Free Compartment
- Surplus product
- Etc

Domestic Market

International Market Access

Timeline HPAI H5N1 & LPAI H9N2 in Indonesia

2004
First outbreak of HPAI
H5N1 declared
Clade 2.1.3

2005
First human cases of
H5N1 clade 2.1.3.2

2012
First detection of
H5N1 clade 2.3.2.1g

2016
First detection of
H9N2 clade B 4.5

2017
Co-circulation of H5N1
Clade 2.3.2.1g & H9N2
Clade B 4.5

2022
First detection of
H5N1 clade 2.3.4.4b

HPAI Control Strategy

Indonesia has officially adopted vaccination against H5N1 since 2004 as one of nine elements ratified as the national HPAI control strategy:

1. Biosecurity improvement
2. **Vaccination**
3. Depopulation in endemic areas
4. Re-shape the poultry marketing system
5. Surveillance (tracing)
6. Restocking
7. Stamping out in the newly infected area
8. Public awareness and education
9. Monitoring and evaluation

Key Experience:
Vaccine and Vaccination

- Initial efforts to control HPAI H5N1 were based on *stamping out*; but these were unsuccessful.
- In 2004, First DIVA Vaccine Roled Out (H5N2 & H5N9), MoA adopted a vaccination program, but not to effective because different N Types (heterologous).
- Since 2011, homologous in-activated vaccine using local strains
- Director General DGLAHS make decision on AIV challenge isolate(s) and update (if necessary) based on influenza virus monitoring (IVM)
- Licensing procedures for Veterinary Products under Indonesian legislation, including independent testing at NVDAL (involving challenge trials at Animal Biosafety Level 3/ ASBL-3)
- "*3 Tepat*" (The Power of 3) Campaign: **Right Vaccine, Right Schedule, and Right Methods**

Key Improvement:
Animal Health Surveillance

2006

Establishment Participatory Disease Surveillance and Response (PDSR)

2006

National Strategic Work Plan for the Progressive Control of HPAI, 2006 – 2008

2009

MoA Regulation for HPAI Arrangement Poultry Compartement and Zone

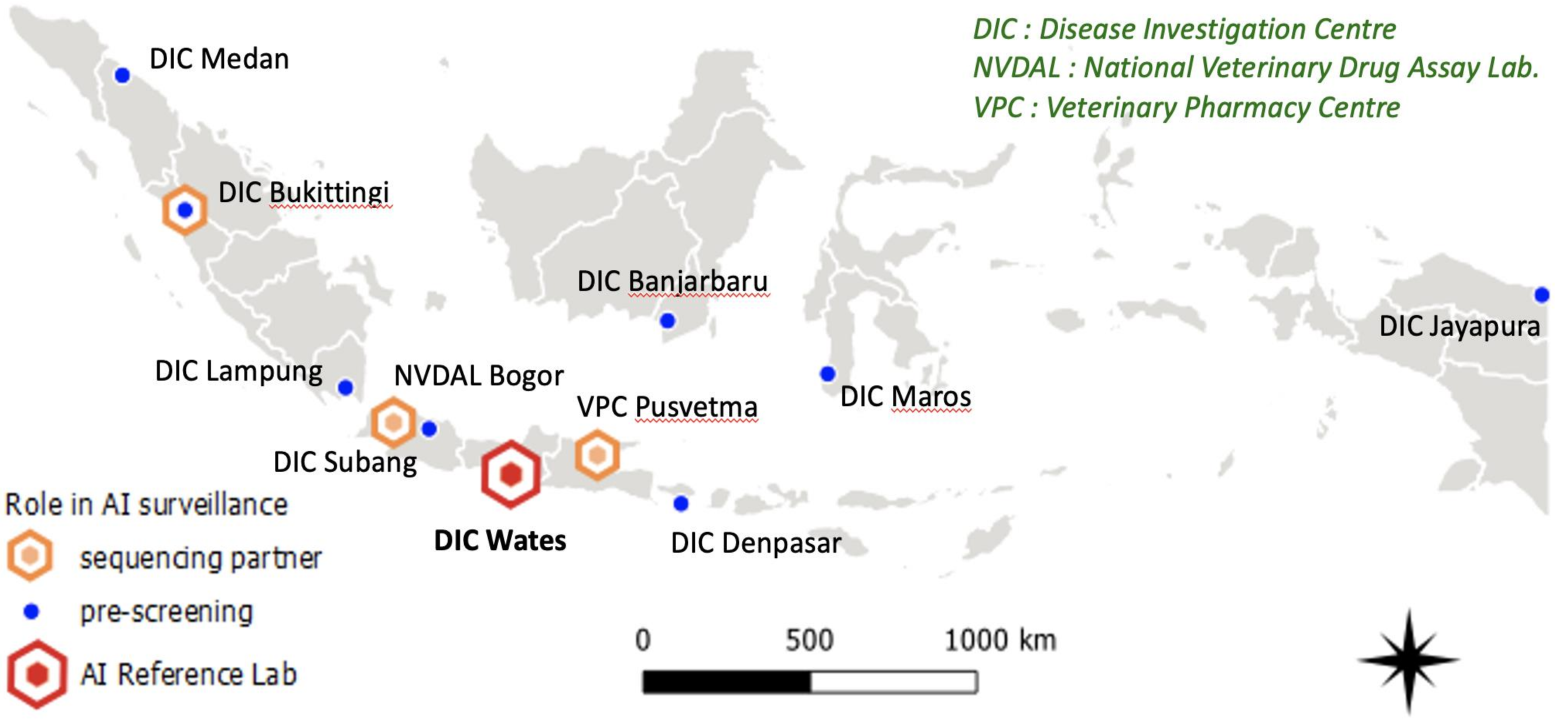
2013

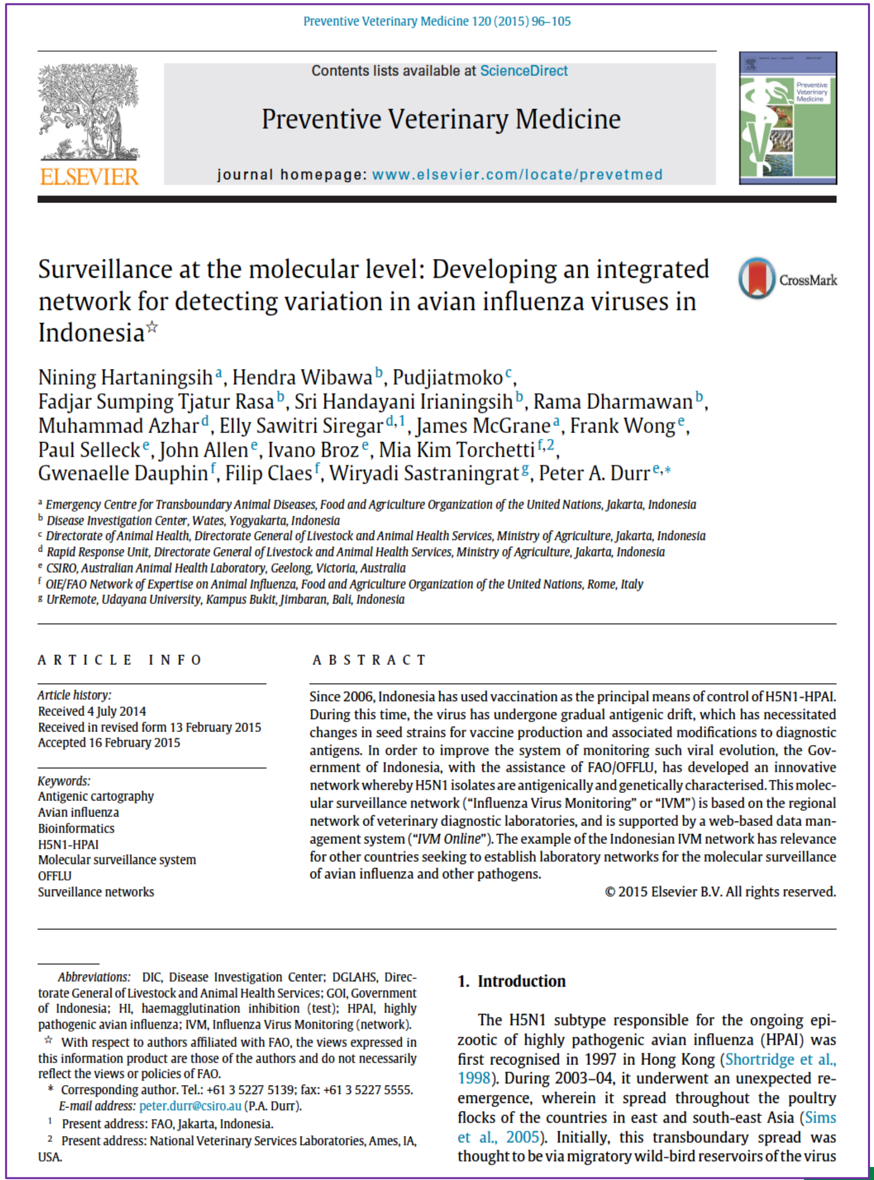
Establishment of *integrated* National Animal Health information system (iSIKHNAS)

2014

MoA launched *Influenza Virus Monitoring* (IVM) Network

Influenza Virus Monitoring (IVM) Network





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Surveillance at the molecular level: Developing an integrated network for detecting variation in avian influenza viruses in Indonesia☆

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A B S T R A C T

Since 2006, Indonesia has used vaccination as the principal means of control of H5N1-HPAI. During this time, the virus has undergone gradual antigenic drift, which has necessitated changes in seed strains for vaccine production and associated modifications to diagnostic antigens. In order to improve the system of monitoring such viral evolution, the Government of Indonesia, with the assistance of FAO/OFFLU, has developed an innovative network whereby H5N1 isolates are antigenically and genetically characterised. This molecular surveillance network ("Influenza Virus Monitoring" or "IVM") is based on the regional network of veterinary diagnostic laboratories, and is supported by a web-based data management system ("*IVM Online*"). The example of the Indonesian IVM network has relevance for other countries seeking to establish laboratory networks for the molecular surveillance of avian influenza and other pathogens.

Abbreviations: DIC, Disease Investigation Center; DGLAHS, Directorate General of Livestock and Animal Health Services; GOI, Government of Indonesia; HI, haemagglutination inhibition (test); HPAI, highly pathogenic avian influenza; IVM, Influenza Virus Monitoring (network).

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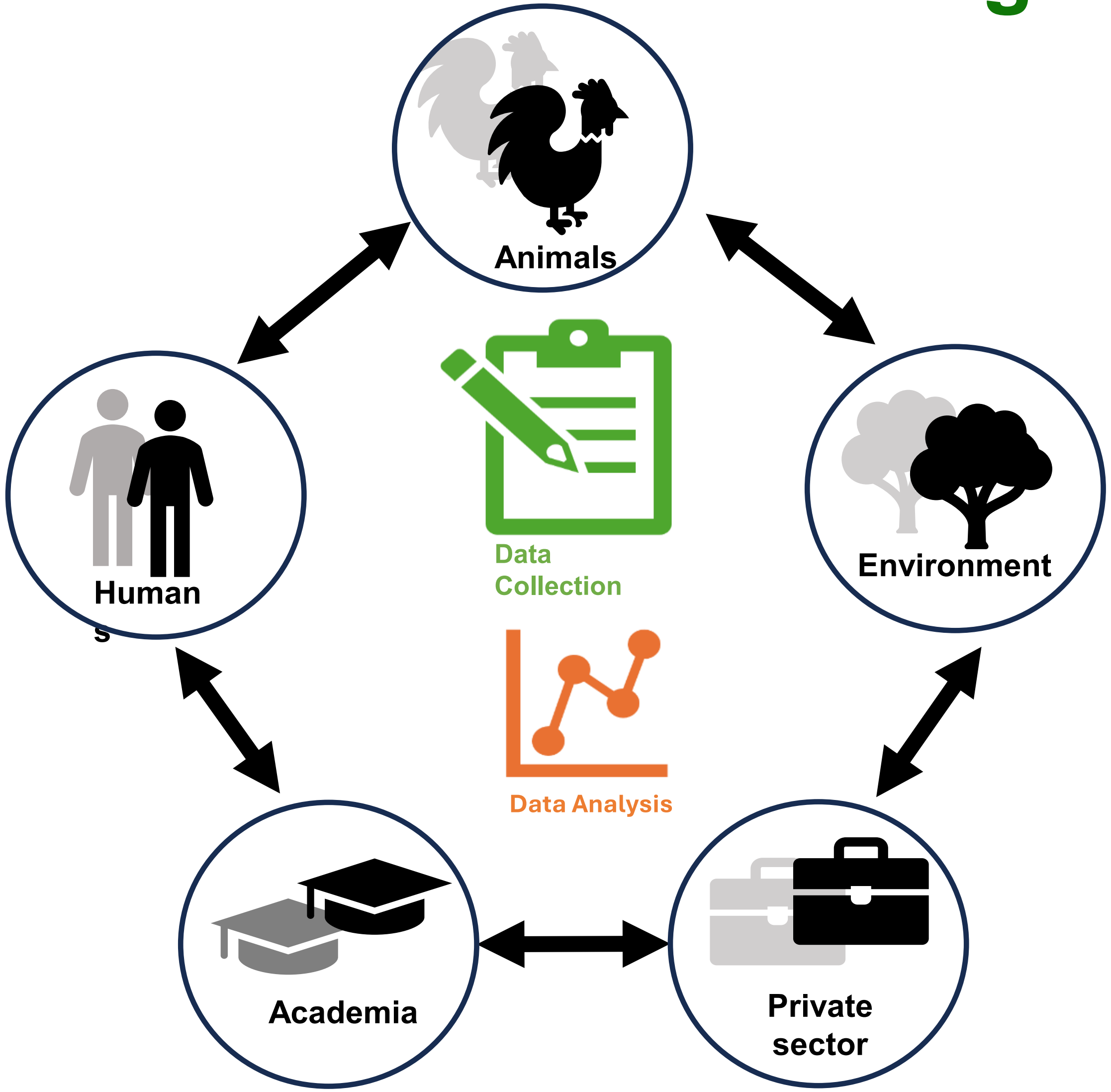
1. Introduction

The H5N1 subtype responsible for the ongoing epizootic of highly pathogenic avian influenza (HPAI) was first recognised in 1997 in Hong Kong (Shortridge et al., 1998). During 2003–04, it underwent an unexpected re-emergence, wherein it spread throughout the poultry flocks of the countries in east and south-east Asia (Sims et al., 2005). Initially, this transboundary spread was thought to be via migratory wild-bird reservoirs of the virus

Aim:

- To detect and monitor the presence and the variation of Avian Influenza virus circulating in Indonesia and to accelerate the reporting of virus monitoring to decision makers at the National level.
- IVM collaboration and coordination network between Government Veterinary Labs, Private Sectors and Universities.
- IVM Online launched in 2014.

Public-Private Partnership: Building Trust with IVM Network



- **Transparency**
  Sharing data between sectors
  (e.g., first detection of clade 2.3.4.4b came from private sector data)
- **Mutual Trust**
  Ensuring shared data benefits all sectors
  (e.g., IVM data improved vaccination strategy)
- **Shared Responsibility**
  Clear roles across sectors
  (e.g., national reference lab for sequencing and analysis of AI isolates)
- **Continuous Communication**
  Regular IVM meetings with all sectors

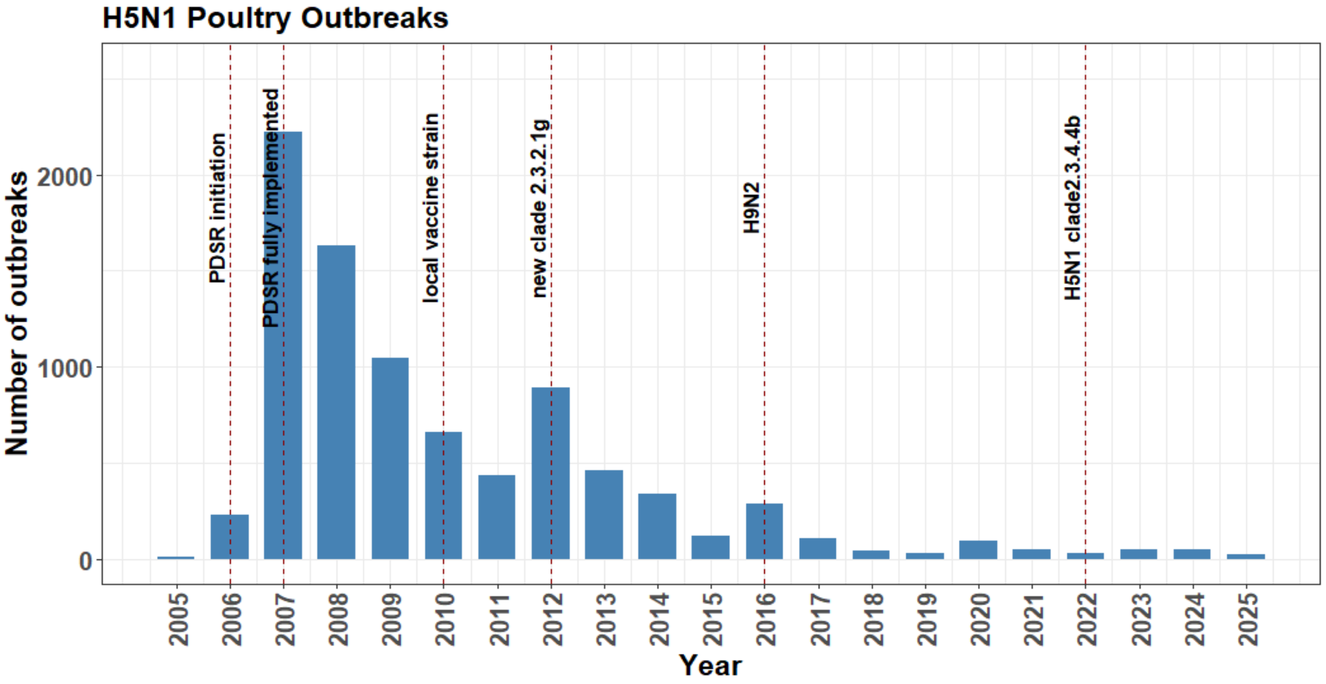
The Benefits of IVM Network for AI Surveillance & Vaccination

- **2012**: Identification of a new clade (2.3.2.1g) HPAI H5N1 virus incursion into Indonesia lead to the successful and timely development vaccine produced locally in VPC Pusvetma,
- **2014-2017**: Provided recommendation to update master seed vaccine due to significant mutations of HPAI H5N1,
- **2017**: Rapid detection and identification of LPAI H9N2 from egg drop production disease syndrome in layer farm followed by development of H9N2 local vaccine,
- **2018-2021**: Updated challenge strains for vaccine efficacy due to mutation of HPAI H5N1 clade 2.3.2.1g,
- **2022**: Rapid detection and identification of new clade 2.3.4.4b following with updating diagnostic (primer & probes) and IVM algorithm

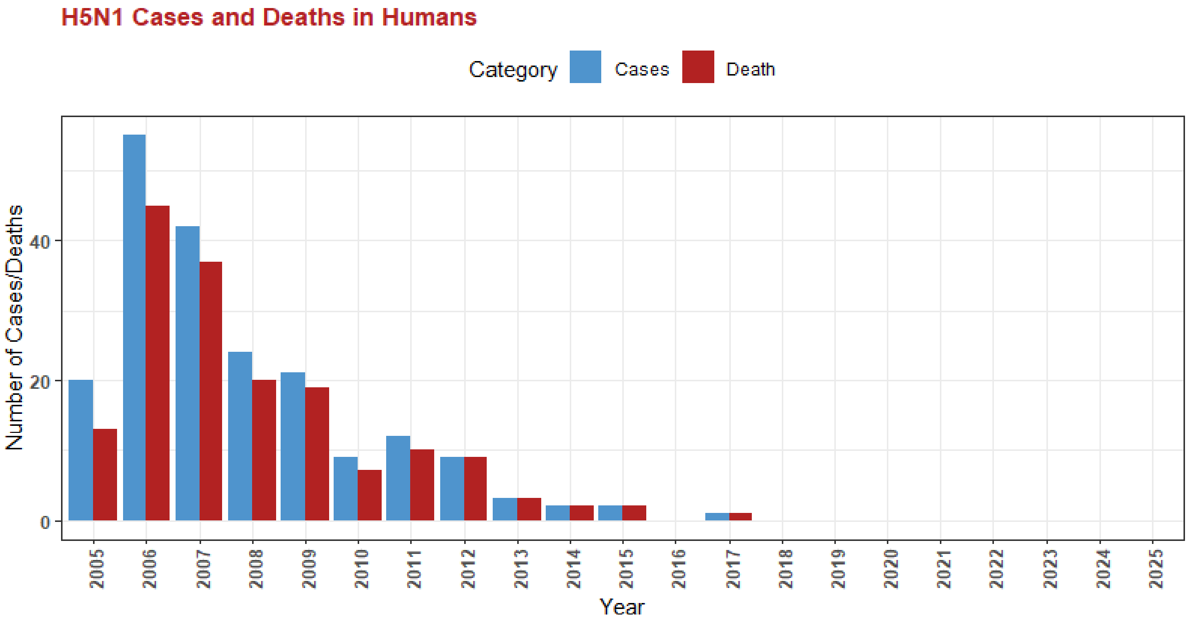
2.3.2.1. vaccine

Impact of Progressive Control of HPAI

- HPAI outbreaks declined gradually from 2005; under control since 2017
- Human cases declined, no human case after last case in 2017



Source: PDSR reports and iSIKHNAS



Source: SKDR Ministry of Health Indonesia and Monthly Report Zooonosis 2005 sd 2025
**First Human Cases Was Reported in 2025*

Impact of Progressive Control of HPAI

Poultry Compartments free from HPAI

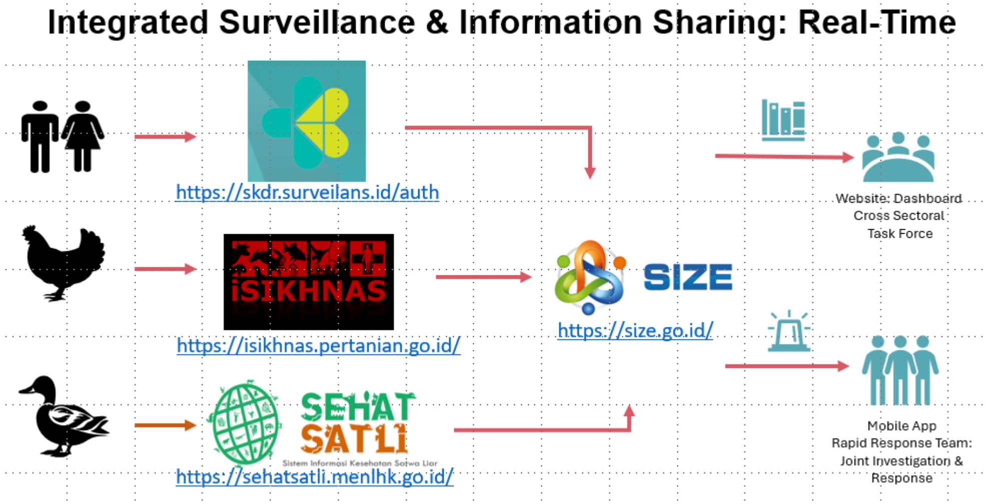
Type of Production	Number of Poultry Compartments free from HPAI
Grand Parent Stock	28
Parent Stock	115
Final Stock	96
Hatchery	46
Total	285

International Market Access

Products	Countries
Live chicken (broiler)	Singapore
DOC	Singapore, Timor Leste
Hatching eggs	Brunei, Myanmar, UEA
Table eggs	Singapore, UEA
Frozen chicken	Singapore, Timor Leste
Duck salted eggs	Singapore
Processed Food Product	Bangladesh, Hong Kong, Japan, Kuwait, Oman, Papua New Guinea, Philippines, Qatar, Singapore, South Korea, Thailand, Timor Leste, Türkiye, UEA

Mitigation of Zoonotic Risk of HPAI and LPAI

- First human cases reported in 2005 (200 cases during, last case in 2017)
- Multisectoral One Health Coordination Mechanism
    - Komite Nasional Pengendalian Flu Burung dan Kesiapsiagaan menghadapi Pandemi Influenza (KOMNAS FBPI) 2006 - 2010
    - Komite Nasional Pengendalian Zoonosis (KNPZ) 2011 - 2016
    - Regulation of the Coordinating Ministry for Human Development and Culture No. 7/2022: Guidelines for Zoonosis and EIDs Prevention and Control
- One Health Operationalization: integrated surveillance & information sharing; joint investigation & response; joint risk assessment, integrated risk communication, etc.



Conclusion

- Integrated surveillance in the animal health sector, complemented with molecular surveillance (Influenza Virus Monitoring or "IVM"), is essential to achieve all surveillance objectives:
    - Detecting exotic diseases or emerging diseases as early as possible
    - Demonstrating the **absence** of infection → HPAI Free Zone & Compartment
    - Determining the **presence or distribution** of infection
    - Monitoring circulated AIV → updating vaccine & challenge virus (vaccine matching)
- Coordinated surveillance in the human-animal-environment interface, followed with joint risk assessment, is important as a basis for integrated risk mitigation and risk communication of zoonotic influenza
- Integrated and coordinated surveillance in human-animal-environment → **Resilient Avian Influenza Control**: ***support food security, health security & farmer livelihood***

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